

- f) Using the combination to remove water or debris from the automobile windshield.

REMARKS

Original Claims 1 and 2 and New Claim 3 are pending in this application. A clean copy of New Claim 3 is attached hereto as Exhibit 1.

The examiner rejected original Claims 1 and 2 under 35 U.S.C. § 102 (b) as anticipated by Carboni (French Patent 2,482,540). As explained below, the rejection is ill founded as to original Claims 1 and 2 and does not apply to New Claim 3 which is directed to a method of cleaning a windshield. A true copy of a Certified English Translation of Carboni is attached hereto as Exhibit 2.

As can be seen from the enclosed translation of Carboni, the disclosure therein is not directed to a transparent arm and blade combination alone. In fact, Carboni is directed to general windshield wiper technology and only refers to transparency in passing. Further, it does not identically disclose the method steps in New Claim 3. Therefore it is respectfully requested that the examiner withdraw the rejection and allow the pending claims.

Dated: 9/15/09

Respectfully Submitted,

By: 

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Claim 3

A method for cleaning water or debris from an automobile windshield while not interfering with the driver's vision comprising the following steps:

- a) Fabricating a windshield wiper arm from a transparent material;
- b) Fabricating a windshield wiper blade from a transparent material;
- c) Attaching the wiper blade to the wiper arm to form a combination;
- d) Providing the combination to the public via retail trade channels;
- e) Replacing an automobile's conventional windshield wiper assembly with the combination; and
- f) Using the combination to remove water or debris from the automobile windshield.

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CERTIFICATION

THIS IS TO CERTIFY THAT THE FOLLOWING IS, TO THE BEST OF OUR
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THE English LANGUAGE OF THE ATTACHED DOCUMENT
WRITTEN IN THE French LANGUAGE.

THE 10 DAY OF May 2004

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INVENTION PATENT APPLICATION

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No. 81 97455

54 Windshield wiper for vehicles

51 International classification (Int. Cl. 3): B 60 S 1/38

22 Date of filing April 14, 1981

33 32 31 Priority claimed: *Italy*, May 16, 1980 No. 67 769 A/80

41 Date of availability to the public
 of the application B.O.P.1 - "Lists" No. 47 dated 11/20/1981

71 Applicant: CARBONI Luigi, residing in Italy

72 Invention by: Luigi Carboni

73 Title holder/beneficiary: idem 71

74 Empowered agent: Cabinet Faber
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The purpose of this invention is a windshield wiper that is largely made of a synthetic material, for installation on the windshield or on the rear windshield of land vehicles, aircraft and vessels.

Windshield wipers, made traditionally of metal and rubber, were expensive due to the complexity of their structure as well as to the necessity of using costly weather resistant materials, and they were relatively heavy and they broke down easily. Moreover, very often, they were damaging the glass on which they were operating by scratching it. Numerous attempts have been made to produce windshield wipers made of a synthetic material, and in particular, a transparent synthetic material that obstructs the driver's vision as little as possible; considerable contributions have been made in this area by previous patents originating from the same inventor; however, all related problems have not been resolved in a satisfactory manner. In particular, there were structural difficulties or complications to secure the wiper to the wiper blade and to position the wiper correctly and efficiently against the glass to be wiped, since the latter often has a related [sic] (convex) surface.

The purpose of this invention is to produce a windshield for the main part made of a synthetic material, preferably transparent, with a very simple structure, permitting the easy installation of the wiper and possibly its easy replacement and ensuring under any condition an efficient and proper application of the windshield wiper against the glass to be wiped.

This objective is achieved, according to the invention, with a windshield wiper for the main part made of a synthetic material, comprising a blade, a wiper holder and a wiper, characterized by the fact that the blade is made to a considerable extent in a straight line and that it can be bent elastically, and that it presents attaching means at its ends; that the wiper-holder is to a considerable extent in the form of flexible but non-expanding strip, that it presents at its ends securing means in addition to those of the blade and that it has a length that is shorter than that of the blade so that, when it is secured to the blade at both ends, it maintains the blade in an arched elastic form, which produces a tension, and that the wiper is applied to the wiper holder by means of links distributed over its full length and so that it is not exposed to longitudinal stresses.

The invention is now going to be described in greater detail while making reference to particular modes of execution given only as an example, and as shown on the attached drawings:

Fig. 1 is a partial side view of a windshield wiper according to the invention with a partial cross section attachment;

Fig. 2 is a similar view of the blade alone in a non-arched condition;

Fig. 3 is a front view, and

Fig. 4 is a cross section according to the IV-IV line of figure 3;

Fig. 5 is a partial front view of the wiper holder and

Fig. 6 is a longitudinal section according to the VI-VI dotted line of figure 5;

Fig. 7 represents on a greater scale, a cross section of the whole wiper holder with the wiper, according to the VII-VII line of figure 1;

Fig. 8 represents a variant of the wiper holder shown in figure 5;

Fig. 9 represents a variant of the blade shown on figure 1;

Fig. 10 represents a variant of the end of the blade according to figure 9;

Fig. 11 is a front view of the end of the blade according to figure 10;

Fig. 12 represents a wiper holder made of a plastic material with a metal reinforcement;

Figs 13 and 14 represent on a larger scale the sections according to XIII-XIII line of figure 12, of two modes of execution of the wiper holder with reinforcement;

Fig. 15 is an uninterrupted frontal view of a blade holder arm adjusted for the blades according to the invention;

Fig. 16 is a side view thereof, as a partial section and

Fig. 17 is as a section according to the XVII-XVII line of figure 15;

Fig. 18 represents a variant of the central portion of the blade according to figure 3, that can operate with the arm according to figures 15 to 17.

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As is shown in figure 1, the windshield wiper according to the invention mainly includes a blade 1, a wiper holder 2 and a wiper 3. These components are only shown partially but it must be very clear that the part not shown is to a considerable extent symmetrical to the one shown.

Blade 1, shown in particular on figures 2 to 4, includes a central supporting portion, consisting of two walls 11 delimiting a central opening 12 and supporting a pin 13. On both sides of this central portion, two intermediate elongated portions 14 extend that represent the greatest part of the length of the blade and that present a flattened and streamlined cross section (figure 4) that becomes smaller in size from the central portion towards the ends, while comprising slightly inclined plates 15 and from one of the sides (the one that is turned towards the glass to be wiped), securing or holding teeth 16 are protruding. Blade 1 is made of an appropriate synthetic material, that is rigid but with remarkable elasticity and breaking strength, capable of withstanding a great elastic bending force without breaking and while developing a considerable elastic force. Among the synthetic resins presently used for this application in particular, it is worthwhile to use the polycarbonate group and especially materials of the LEXAN type. Preferably, and in addition, the blade is transparent and colorless so that it will obstruct vision through the windshield wiper as little as possible.

To connect this blade to a blade holder arm of the common type, a connector 4 can be used just like the one shown in figure 1, comprising an ear 17 for connecting to pin 13 of the blade; to this ear is linked a hollow sleeve 18 containing a small spring 19; these components are made and sized so as to permit the connection onto the end of a standard blade holder arm.

For the variant shown in figure 9, blade 1 shows the same parts as those described but in a totally symmetrical form, so that the blade - that has two securing or holding teeth 16, one at each end - can be applied irrespective of its orientation. The benefit of this makeup resides in the fact that if the material of the blade, following use over a long period of time or because it is exposed to high temperatures, adopts a certain permanent curvature and as such is no longer capable of holding the wiper holder sufficiently tight, it suffices to take off the blade and to install it again upside down to restore its initial qualities.

Instead of providing end 15 of the blade with two teeth 16, as is shown by figures 10 and 11, end 15' can be made up as a fork with two articulated ears 15'' and with a pin 19', install an oscillating tooth 19 that can be moved onto the other from one side or the other, as needed. Taking into account the great stress to which it is subjected, tooth 19 can also be made beneficially of metal.

Wiper holder 2 is roughly speaking made up of a strip 21 along the centerline of which are distributed longitudinal slots 20 that permit installation of the wiper. Ends 22 of strip 21,

preferably having a greater thickness as is shown in figure 6, show slots 23 that have securing means and that match with teeth 16 of blade 1. Figure 1 clearly shows that ends 22 of wiper holder 2 attach onto ends 15 of blade 1 after the latter has been curved so that the attachment can be made; the length of wiper holder 2 is also shorter than the length of blade 1 so that, once attached, the latter remains curved as a result of the elastic stress, and tightens the wiper holder, as shown in figure 1.

It is clear that wiper holder 2 can be attached and removed easily and quickly from blade 1 while accidental separation during operation is not possible. The elastic tension of wiper holder 2 subsequently assures a correct and effective positioning of the wiper against the glass to be wiped, when the latter has a curved surface.

Wiper 3 includes a basic part 30 aimed at being supported over an extended surface against wiper holder strip 21, and from its centerline, from the side to be turned towards the glass to be wiped, extends part 31 that forms a wiping blade. As is shown by figure 7, this wiping blade 31 has a section that has to a considerable extent the form of a curved triangle and it is separated from base 30 by a contraction 32.

Thanks to this makeup, wiping blade 31 can incline by the bending action of contracted part 32, to achieve the beneficial inclination to glide without a problem over the glass, even if the latter contains little moisture and has a high friction coefficient, and at the same time, the wiping blade does not undergo bending in its active part and as such maintains contact with the glass even when friction is not evenly distributed, as is the case when dirt or grease spots are present on the glass. On the opposite side of wiping blade 31, base 30 presents at given times (at slots 20 of the wiper holder), ribs 33 that end in a widened part 34, that are aimed at crossing slots 20 and to secure wiper 3 to wiper holder 2.

Wiper 3 is made of a flexible material that has a low friction coefficient, with little wear, and that is preferably transparent and considerably colorless. It has been demonstrated that a silicone type rubber is the most appropriate material for this purpose among the synthetic materials presently available on the market.

Wiper holder 2 on the other hand is a flexible but non-expandable material, with a high tensile strength and not (or little) subjected to plastic deformations when cold under traction. Among the materials that have been shown to be appropriate for this purpose, one must mention the polyamide resins, like the ones that are called "rilsan", and that are also available in almost transparent and colorless varieties. However, a wiper holder construction of thin steel plate has shown to be particularly reliable.

As a variant of the form presented in figure 5, the end of the wiper holder could be widened as is shown in figure 8. From this figure, it appears that end 22' of wiper holder 2' has a width greater than its part in the form of strip 21' that extends over the greatest part of its

length. The greatest width of end 22' can replace the greatest thickness of end 22 of wiper holder 2 according to figure 6, or can be used with it. Similarly, securing slots 23' have a greater clearance at securing slots 23 and, needless to say, the securing or holding teeth of the ends of the blade must have a correlatively higher clearance and it may even have a greater width. For this variant, slots 20' for attaching the wiper can practically extend up to the end of the wiper holder. By providing an appropriate cavity in the ends of the blade, the wiper can as such extend through its active part up to the end of the blade, instead of ending at a short distance from the latter, which is taking place in the first mode of execution described, and as is shown in figure 1.

If the wiper holder is made of a plastic material, in particular after a long period of usage or long-time exposure to high temperatures, permanent lengthening can take place and consequently, a reduction in tension. To prevent this, if one does not want to use a metal wiper holder, it can be outfitted with an integrated metal reinforcement 24 (see figure 12). This reinforcement can consist of a steel wire, as is shown in Figure 1 or by a strip 25 as is shown by figure 14. In both cases, the ends of the reinforcement extend beyond the ends of wiper holder 2 and form a handle 25 that constitutes an attachment device replacing slots 23. If the reinforcement is flat, it can be bent at a 90° angle into handle 25 to provide a better support. This attachment handle 25 is particularly appropriate for working with an oscillating tooth like tooth 19 according to figures 10 and 11. In this case, the metal reinforcement supports the full traction effort and there is no need to fear an expansion of the plastic body of the wiper holder which as such can also be manufactured with a relatively cheap material.

Figure 12 also shows how, contrary to what is shown in figure 5, slots 20 used for attaching the wiper can have a great extension in length and, for instance, can be only two or three in number over the length of the wiper holder.

As indicated before, the blade according to the invention can be applied to a common blade holder arm and in this case, it can be very quickly replaced for a common blade. However, application of the invention offers the greatest benefits when installing onto the blade, a blade holder arm that is also made of a synthetic material that is preferably transparent. A blade holder arm 5 appropriate for this purpose is represented by figures 15 to 17. In essence, it includes a contracted and deviated arm 50 near the end that terminates into a yoke 51 to support the blade. On the opposite end, a connector 52 links arm 50 to another supporting yoke 53 that can be installed on the articulation of the window shield wiper drive shaft.

Arm 50 is made of synthetic resin, and preferably transparent; for this arm, the same material used for manufacturing blade 1, such as a polycarbonate, can be used advantageously. The section of this arm 50 preferably presents crests as shown by figure 17, to adjust its rigidity and reduce the weight; in addition, they improve the esthetic aspect of the unit and prevent arm 50 from turning when it is embedded in connector 52.

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When the end of the blade holder arm has a yoke like yoke 51, through which a hole 54 is made for holding a link pin, blade 1 is modified in its central part as shown by figure 18. In this case, blade 1' shows, between its intermediate sections 14', a reduced central part 11', in which a hole 10' is drilled to hold a link pin to yoke 51. As a variant, the blade holder arm could end in a perforated ear, instead of a yoke, and in this case, it would be appropriate to hold a blade, such as blade 1 of figures 1 to 4.

In addition, it is clear that the articulation between the blade and the blade holder arm can also be executed in different ways. Likewise, the number, the form and the layout of the securing or holding teeth of the blade for the wiper holder can be selected differently.

It is well understood that this invention is not limited to the above modes of execution. Numerous detailed modifications can be made to it without stepping outside the scope of the invention.

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CLAIMS

1. Windshield wiper, largely made of a synthetic material, for vehicles, mainly consisting of a blade (1), wiper holder (2) and a wiper (3), characterized by the fact that the blade (1) is executed in a form that is considerably straight-lined and that can be elastically bent, and by the fact that it presents at its ends (15) attachment means (16); wiper holder (2) is considerably in the form of a flexible but non-extendible strip (21) and shows at its ends (22) other attachment means (23) in addition to those (16) for blade (1); the length of said strip is less than that of the blade, so that, when attached to the blade at both ends, it maintains blade (1) in an elastically arched fashion which produces a tension, and with wiper (3) applied to wiper holder (2) by means of links (33-34-20), distributed over its full length, and so as not to be exposed to longitudinal stresses.
2. Windshield wiper, according to claim 1, characterized by the fact that the additional attachment means (16-23) of the blade and of the wiper holder are made up of teeth (16) of one of the elements and matching slots (23) of the other element.
3. Windshield wiper, according to claim 1, characterized by the fact that ends (15) of blade (1) are inclined so as to be considerably coplanar, while blade (1) is kept curved by the wiper holder (2) when installed.
4. Windshield wiper, according to claim 1, characterized by the fact that blade (1) presents intermediate contracted portions towards the ends (15) and a streamlined section.
5. Windshield wiper, according to claim 1, characterized by the fact that blade (1) is symmetrical with respect to an intermediate point in the middle of its length, and can be mounted in one direction or the other.
6. Windshield wiper, according to claim 5, characterized by the fact that each end (15) of blade (1) includes securing teeth (16) for the wiper holder (2) that are located on both sides.
7. Windshield wiper, according to claim 5, characterized by the fact that each of its ends (15) presents a pivoting tooth (19) that can be brought to oscillate on one side or the other of blade (1) according to the mounting position of the latter.
8. Windshield wiper, according to claim 1, characterized by the fact that linking means (33-34-20) between wiper (3) and wiper holder (2) comprise a series of

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slots (20) made longitudinally over the centerline in wiper holder (2) and a series of matching ribs (33) of wiper (3), with these ribs being extended by retaining flanges (34).

9. Windshield wiper, according to claim 1, characterized by the fact that wiper (3) shows a supporting base (30) to rest against a face of wiper holder (2) and on one side of said supporting base (30), linking items (33-34) that connect it to wiper holder (2) and on the opposite side of the base (30), a blade that is considerably triangular in shape, separated from base (30) by a contracted part (32).
10. Windshield wiper, according to claim 1, characterized by the fact that wiper holder (2) is made of thin steel plate.
11. Windshield wiper, according to claim 1, characterized by the fact that wiper holder (2) is made of a wire reinforced plastic material (24) or of longitudinal metal strips (26) that protrude at both ends of wiper holder (2) while forming handles (25) used to attach wiper holder (2) to blade (1).
12. Windshield wiper, according to claim 1, characterized by the fact that ends (22) of wiper holder (2) are thicker and/or wider with respect to central part (21) of wiper holder (2).
13. Windshield wiper, according to claim 1, characterized by the fact that its principal parts are at least made of an almost transparent and colorless synthetic material.
14. Windshield wiper, according to claim 1, characterized by the fact that blade (1) is made of polycarbonate, preferably of the "lexan" type, and that wiper holder (2) is made of polyamide resin, preferably of the "rilsan" type, and that wiper (3) is made of silicone rubber.
15. Windshield wiper, according to claim 1, characterized by the fact that it also includes a blade holder arm (5) for which the longest part (50) at least is made of a preferably transparent synthetic material.
16. Windshield wiper, according to claim 15, characterized by the fact that arm (50) is contracted, scoured with longitudinal furrows and deviated near end (51) provided with articulation means to blade (1), and by the fact that at the opposite end, arm (50) is linked by a connector (52) to a yoke (53) that can be mounted onto the articulation of the windshield wiper drive shaft.
17. Windshield wiper, according to claim 15, characterized by the fact that arm (50) is made of polycarbonate, preferably of the "lexan" type.

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95424 D/52 A95 Q17 (A23 A26) CARB/ 16.05.80
CARBONIL *FR 2482-540
16.05.80-IT-067769 (20.11.81) B60s-01/38
Windscreen wiper head - with components of polycarbonate,
polyamide and silicone rubber to save wt. and simplify assembly

A windscreen wiper is assembled from a rigid elastic bow held taut by a strap lining the bow ends and to which the wiper blade is attached. The components are engaged by tooth and fork or tooth and slot engagements so that the wiper blade itself is not longitudinally stressed.

DETAILS

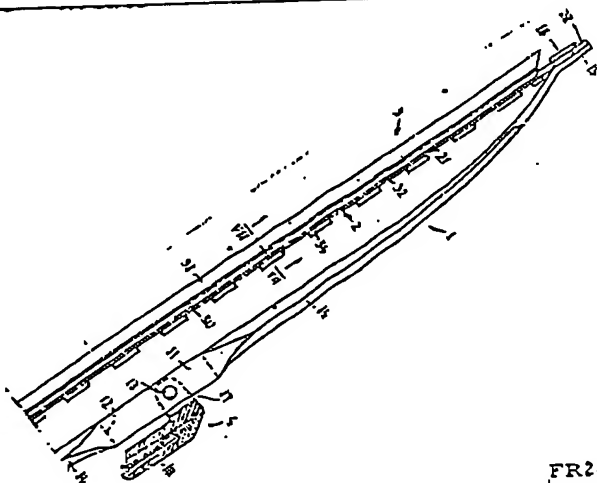
Pref. the bow is made of 'Lexan' (RTM) polycarbonate; the strap is made of 'Rilsan' (RTM) polyamide (e.g. polyamide-11) opt. reinforced internally with (metal) wire or tape; and the blade is of silicone rubber. The arm on which the wiper bow is supported from a pivot is pref. made from a transparent synthetic matl. such as 'Lexan' (RTM) polycarbonate.

ADVANTAGE

The design reduces wt., assembly cost and interference with driver's vision. (16pp515).

A(12-T4)

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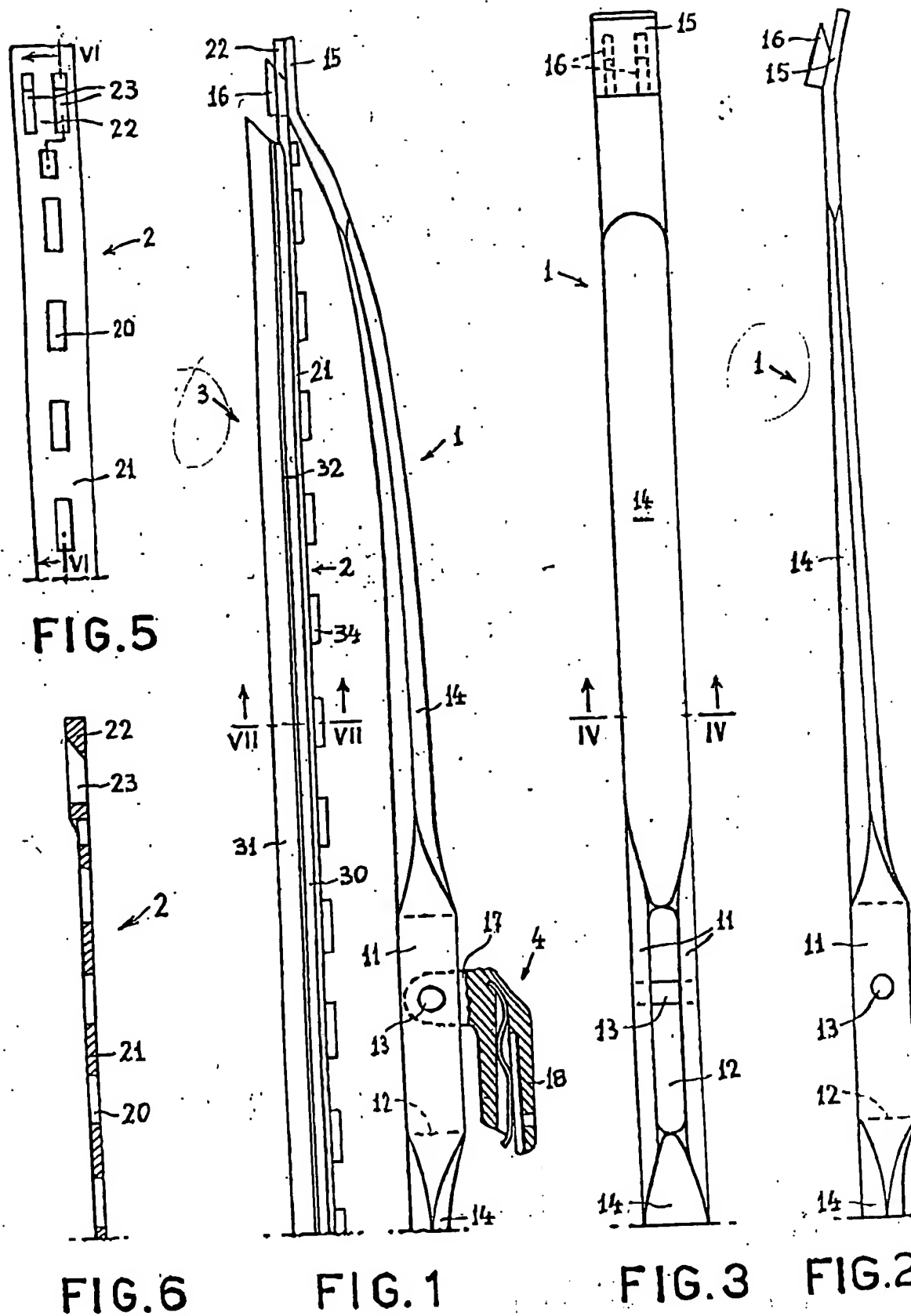
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Pl. 2/3

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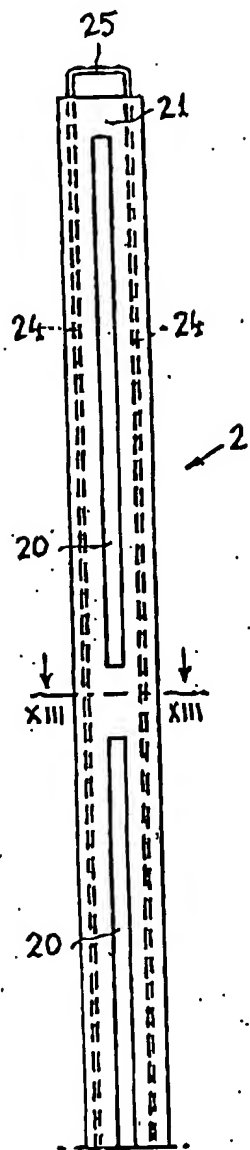


FIG. 12

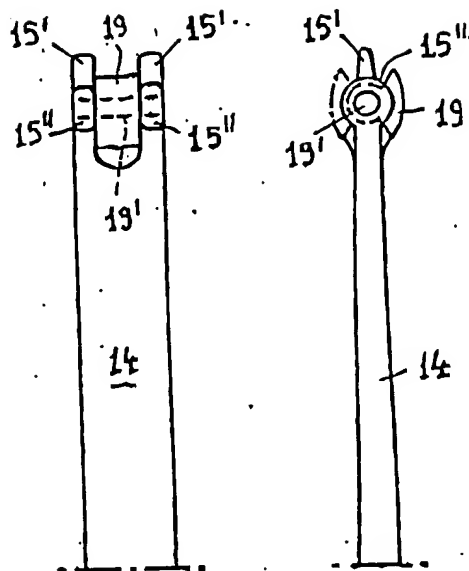


FIG. 11 FIG. 10

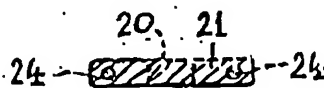


FIG. 13

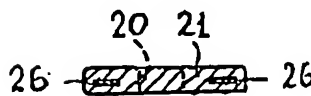


FIG. 14

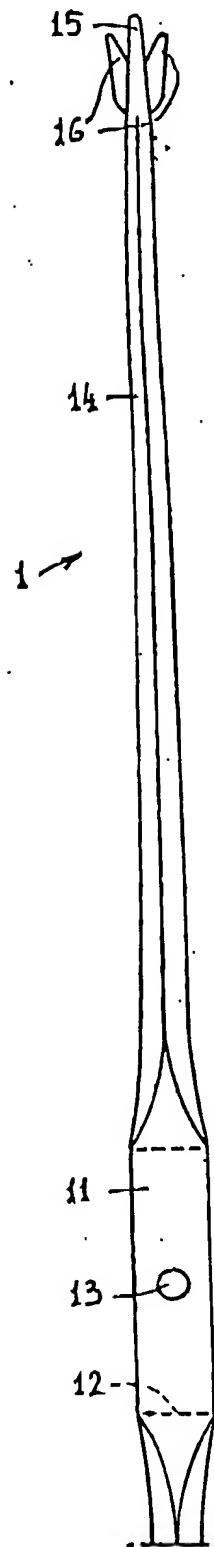


FIG. 9

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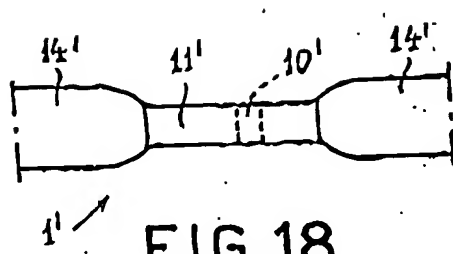


FIG. 18



FIG. 4



FIG. 17

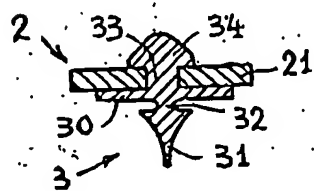


FIG. 7

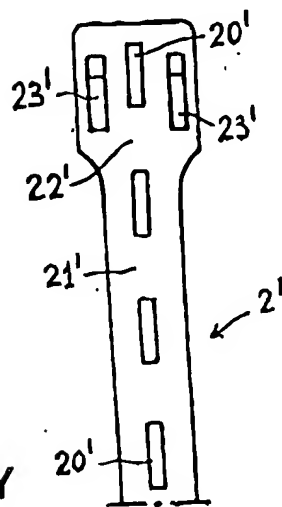


FIG. 8

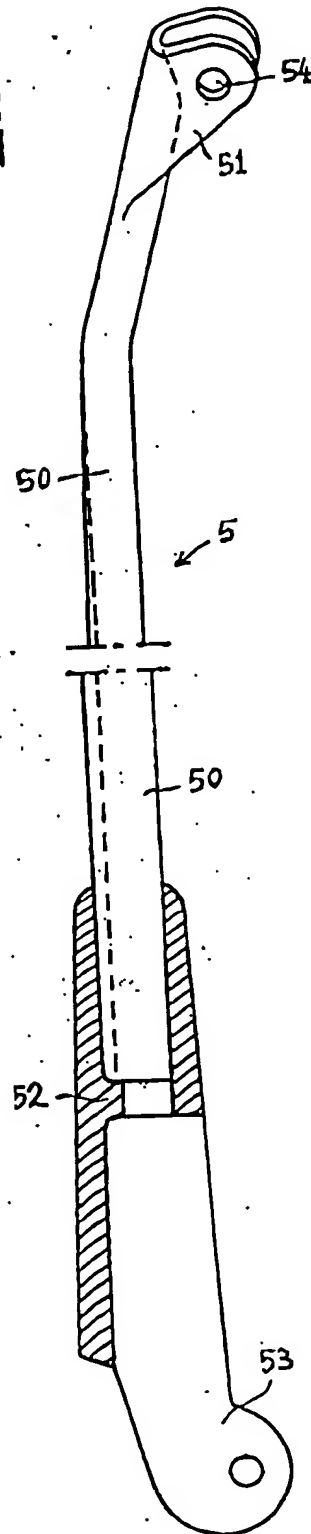


FIG. 16

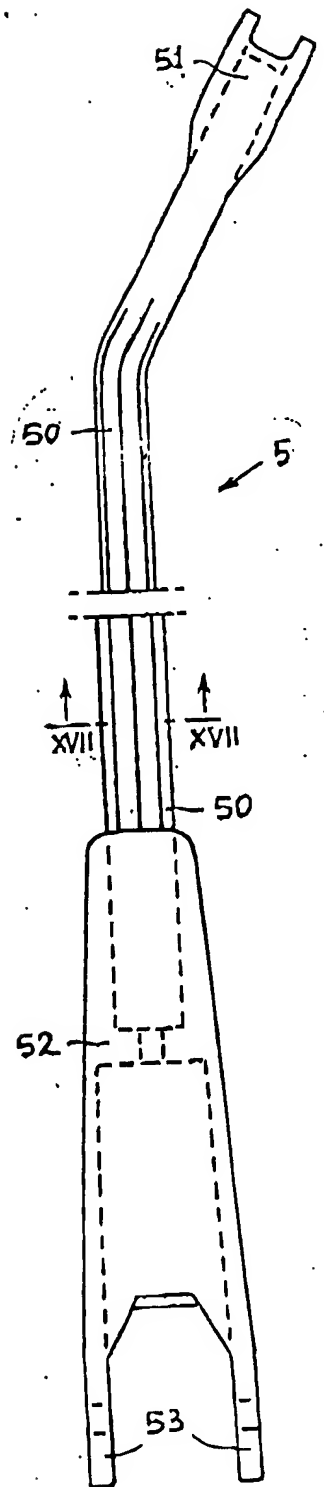


FIG. 15

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